Section 13 Statutory Determinations

Under CERCLA Section 121 and the NCP, EPA must select a remedy that is protective of human health and the environment, complies with or appropriately waives ARARs, is cost effective, and utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that includes treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element. The following sections discuss how the Selected Remedy meets these statutory requirements.

13.1 Protection of Human Health and the Environment

The Selected Remedy includes components to address human health and environmental risks associated with mining-related wastes and contaminated soils in residential and non-residential areas, residential indoor and attic dusts, alluvial groundwater, and surface water. Unacceptable human health or environmental risks identified in the risk assessment process will be addressed. The Selected Remedy will be monitored and maintained through comprehensive programs using institutional controls, monitoring, and maintenance. There are no short-term threats associated with the Selected Remedy that cannot be readily controlled through applicable health and safety requirements, monitoring, and standard construction practices. In addition, no adverse cross-media impacts are expected from the Selected Remedy.

13.1.1 Solid Media

Non-Residential Source Areas

Non-residential areas include previously reclaimed source areas, unreclaimed source areas, sites not granted "conditional no further action status", and areas such as the Syndicate Pit and Granite Mountain Memorial. The Selected Remedy will protect human health and the environment through the prevention of direct contact with contaminants in these areas. Engineering controls will effectively isolate waste materials, thus preventing human and environmental exposures. These engineering controls include source removal to a repository, consolidation, grading, capping, and land reclamation for areas exceeding lead and arsenic action levels and other source areas demonstrated to contribute contaminant loads to receiving surface waters. Protection will be maintained via a comprehensive O&M plan to ensure the reclamation is achieving performance standards set forth in the BRES. Institutional controls, such as county zoning and permit requirements, will be implemented to ensure that the remedy is not disturbed inappropriately.

Residential Areas

The Selected Remedy addresses elevated arsenic, lead, and mercury in residential areas in two ways. First, all residential properties in the OU will be sampled and those that exceed action levels will be remediated. Second, the Selected Remedy hopes to retain the multi-pathway program intended to further protect human health by

providing a reduction in COCs from a range of potential sources. The program is designed to comprehensively help prevent residential exposures with actions that address a variety of sources, some of which are not mining-related and would not normally be remediated under Superfund (e.g., lead-based paint). The potential sources of lead, arsenic, and/or mercury exposure that will be addressed include soil, house dust, non-living space dust (only if an exposure pathway is established), and interior paint (lead only for paint). This inclusive approach prioritizes residential cleanups to take into account the presence of affected or sensitive populations and non-mining sources of contaminants. EPA believes that the combined programs are the most protective of human health in the BPSOU in the long-term. The multi-pathway program protects sensitive populations from all pathways of exposure, while the all-encompassing sampling and remediation program ensures that all properties within the BPSOU that exceed RGs will ultimately be addressed.

13.1.2 Groundwater

Hydrogeologic conditions in the Metro Storm Drain and LAO areas (i.e., shallow bedrock) allow for the capture of nearly all alluvial groundwater prior to exiting the basin. This groundwater will be routed to a lime precipitation treatment facility at LAO for removal of contaminants and then discharged to Silver Bow Creek. The discharge shall meet the lesser of the chronic aquatic life or human health surface water quality standards presented in Table 8-2. Although the Selected Remedy will not achieve compliance with State standards (DEQ-7) for groundwater in a reasonable time-frame, discharge of metals-contaminated groundwater to surface waters will be prevented.

Base flow from Missoula Gulch will be routed to the LAO hydraulic control channel for treatment along with captured groundwater.

West Camp water from the Butte Mine Flooding Operable Unit will also be routed to the LAO treatment facility. The LAO treatability study showed that the lime treatment facility could effectively treat the combination of West Camp water and alluvial groundwater.

Municipal drinking water is provided from a source outside Butte and domestic use of contaminated groundwater is presently controlled by an ordinance that discourages residential well use. As part of the ICs package, use of alluvial groundwater will be prevented by the expansion of a groundwater control area to include other portions of the BPSOU and possibly other measures. Extensive groundwater monitoring will be conducted to ensure that the groundwater controls are effective and protective of receiving surface waters.

13.1.3 Surface Water

The Selected Remedy will address human health and environmental risks to surface water through the removal of remaining contaminated stream sediments and streambank wastes, and the implementation of a surface water management and BMP program to reduce contaminant loading from storm water runoff. Sediments and

streambank wastes will be removed from Blacktail Creek just above the confluence with the Metro Storm Drain and along Silver Bow Creek down to the reconstructed channel at LAO.

Metals occur in discrete waste piles and are disseminated in soils across the surface of the Butte Hill and, as a result, are readily carried by storm water runoff resulting in exceedances of acute water quality standards in receiving streams during most runoff events. The BMP approach for storm water compliance is established nationally as the most effective means to mitigate impacts from runoff at urban and industrial sites. The BMP approach specified in this ROD is an iterative, site-specific program designed to monitor, identify sources of contamination, and take appropriate corrective action. It will be an aggressive program to monitor water quality in Silver Bow Creek, use these data to target problem areas on the Butte Hill, and design and implement site-appropriate BMPs. The effectiveness of the BMPs will be assessed through continued monitoring. It is likely that monitoring will identify previously unknown source areas that should be addressed. If BMPs are not effective in achieving surface water quality standards in Silver Bow Creek, lime treatment of storm water runoff would be required.

13.2 Compliance with ARARs

The final determination of ARARs by EPA is listed in Appendix A of this ROD. Section 121(d) of CERCLA requires that remedial actions attain a degree of cleanup that ensures protection of human health and the environment and that those remedial actions comply with or appropriately waive ARARs. There are three types of ARARs: contaminant-specific, action-specific, and location-specific.

ARARs for the Butte Priority Soils OU were identified and thoroughly evaluated by EPA as part of the Feasibility Study Analysis of Alternatives. Overall, the preferred remedy is expected to eventually achieve compliance with the key ARARs, except for Federal and State groundwater quality standards in the alluvial aquifer in the Metro Storm Drain and in Lower Area One. A waiver for certain groundwater ARARs is provided in this ROD[7].

The following briefly discusses the most significant of those ARARs for solid media, groundwater, and surface water. Except where noted, this discussion applies to both the Selected Remedy site-wide and the Selected Remedy for the Metro Storm Drain.

[7] See footnote 3 on page D-12 for an explanation of how this waiver of groundwater ARARs also applies to possible floodplain or solid waste ARARs, which may apply to waste left in place in current floodplains.

13.2.1 Solid Media

The Selected Remedy for solid media at the BPSOU includes monitoring engineering covers, vegetation, and solid media left in place; operations and maintenance of past and future actions; ICs; compliance with existing mandated actions; the BPSOU Residential Metals Abatement Program for residential contamination; source area covers; limited future waste removal; and waste repository management. Waste removal refers to the potential removal of source areas possibly identified by the storm water monitoring program or by the ICs.

Because "active management" of solid wastes is planned for certain waste areas (not all waste left in place), certain location-specific federal solid waste[8], mining, and waste regulations and state[9] solid waste regulations are ARARs at the BPSOU. Also, action-specific state solid waste requirements are applicable ARARs[10], and will by complied with if wastes are excavated and disposed in the future.

Action-specific reclamation requirements related to solid media are ARARs for the OU[11] and will be met by the Selected Remedy. This requires revegetation of the land as rapidly, completely, and effectively as the most modern technology and the most advanced state of the art will allow. Relevant and appropriate hydrogeology regulations under this act are also ARARs that will be met by the Selected Remedy.

13.2.2 Groundwater

Capturing groundwater and diverting for treatment provides for long-term protection of Silver Bow Creek but does not achieve ARARs in the alluvial aquifer. The contaminant-specific ARARs for groundwater, shown in Section 8, will not be met. The Selected Remedy does not call for removal of any additional source areas within LAO or Metro Storm Drain. EPA has determined that complete removal of these source areas is not feasible and would not have a significant impact on the eventual attainment of ARARs, because contamination has already spread well beyond the boundaries of the source areas and secondary sources within the alluvium will continue to result in exceedances of groundwater quality standards even if source areas are removed. Additionally, the cost and disruption to the community from removing wide-spread source areas in this urban corridor cannot be justified by the results. This is explained more fully in the TI Evaluation document, and in EPA's detailed response to comments on the TI Evaluation.

The contaminant-specific ARARs for alluvial groundwater will be waived within the TI Evaluation boundary. Groundwater contamination will be addressed via

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[8] Solid Waste Disposal Act, Surface Mining Control and Reclamation Act, Resource Conservation and Recovery Act

[9] Montana Solid Waste Management Act (75-10-201 et. seq. MCA)

[10] Montana Solid Waste Management Regulations (ARM 15.50.505(2))

[11] Montana Strip and Underground Mine Reclamation Act (82.4.201 to 205 MCA)

groundwater capture and lime treatment. Groundwater will be controlled and captured via the LAO hydraulic control channel and the subdrain in the Metro Storm Drain. Captured groundwater will be routed to a lagoon treatment facility at LAO. Remaining saturated solid media in LAO and the Metro Storm Drain will be left in place. Treated water discharged to Silver Bow Creek shall meet all State and Federal point source discharge requirements. Compliance monitoring locations will be specified in the site-wide monitoring program and finalized during Consent Decree negotiations. Sludge produced shall be disposed of in compliance with Federal and State solid waste regulations.

The Selected Remedy for groundwater also specifies the establishment of ICs to prevent use of the aquifer as a drinking water source and an operations and maintenance programs to monitor past and future groundwater actions. To the extent a controlled groundwater area will not prevent the use of existing wells, an education and well abandonment program will be implemented to persuade owners not to use contaminated water and to voluntarily take existing wells out of service in exchange, for example, for being hooked up to public water. An administrative entity will be identified under RD/RA to monitor and enforce these restrictions. The RP Group will be responsible for developing, funding and implementing the ICs as part of the final site-wide ICs Plan.

13.2.3 Surface Water

The State of Montana has promulgated specific water quality standards applicable to the use designation of Silver Bow Creek[12]. Those standards will be applied to all chemicals of concern identified at the BPSOU, both to point sources affected or created by the cleanup and to ambient water. However, discharges from groundwater and storm water treatment systems must meet the lesser of the chronic aquatic life or human health surface water quality standards presented in Table 8-2. If the State standards are changed to be less stringent, the Federal water quality criteria will be identified as the appropriate ARARs.

Surface water at the BPSOU is impacted by contributions of contaminated groundwater and storm water. The Selected Remedy will evaluate the contribution from groundwater as remediation progresses and will ensure that appropriate storm water controls are implemented.

Storm water controls will be implemented based on site-specific evaluation. These controls may include, but are not limited to: storm water retention basins, rerouting, and engineered sediment controls. The storm water controls will meet the applicable state storm water ARARs[13] that require general storm water permits for certain

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[12] MT Water Quality Act (Administrative Rules of Montana [ARM] 17.30.607 (l)(a)(iii)]

[13] MT Pollutant Discharge Elimination System (ARM 17.30.601 et seq. and 17.30.1301 et seq., including 17.30.1332)

activities and refer to the requirement of BMPs to minimize or prevent discharge that may adversely affect human health or the environment.

A monitoring program will evaluate the impacts of the storm water controls on receiving water quality. Additional controls will be implemented if the monitoring program indicates further action is needed.

This combination of monitoring and controls is expected to gradually reduce concentrations of contaminants in surface water, allowing eventual achievement of the concentration-specific ARARs. The ARARs allow for the gradual attainment of requirements in already impacted streams, with the goal of eventual attainment of ARARs.

If the storm water controls are not effective, storm water up to a specific design storm will be captured and treated with lime before being released. EPA, in consultation with DEQ, will make the final determination concerning the effectiveness of the storm water program. The preferred remedies also specify the use of ICs and an operation and maintenance program to ensure the success of interim and final remedial actions.

Certain Federal and State location-specific ARARs are applicable to surface water at the BPSOU because much of the site lies within the floodplain of Silver Bow Creek[14]. It is not anticipated that the Selected Remedy for the OU will have an adverse impact on floodplains or wetlands at the site; if anything, the Selected Remedy would likely improve these areas. However, EPA will consult with the U.S. Fish and Wildlife Service to determine the existence and category of wetlands present at the site and any needed avoidance or replacement. If the Selected Remedy, or subsequent alterations, will impact stream banks or streambeds, EPA will also consult with the U.S. Fish and Wildlife Service; Montana Department of Fish, Wildlife and Parks; Butte-Silver Bow, and the local conservation district, as needed.

13.2.4 Other ARARs

Several federal location-specific ARARs are applicable to the OU and will be met by the Selected Remedy through consultation with the appropriate state and federal agencies and other resources. These ARARs include a variety of acts and treaties[15]

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[14] Federal: Fish and Wildlife Coordination Act (40 CFR 6.302(g)), Floodplain Management Order and Protection of Wetlands Order ((40 CFR Part 6 Appendix A Exec. Order 11,988 and 11990, respectively). State: Floodplain and Floodway Management Act (ARM 36.15.101(13)) Natural Streambed and Land Preservation Standards (Montana Code Annotated [MCA] 87-5-502 and 504)

[15] Endangered Species Act (40 CFR 6.302(h)); National Historic Preservation Act (40 CFR 6.301(b)); Archeological and Historic Preservation Act (40 CFR 6.301(c)); Historic Sites, Buildings, and Antiquities Act (40 CFR 6.310(a)); Migratory Bird Treaty; Bald Eagle Protection Act; and Native American Grave Protection and Repatriation Act

designed to protect endangered species, bald eagles, and migratory birds; encourage historic, archeological, and antiquities preservation; and protect Native American graves. EPA will involve the Tribes and the U.S. Fish and Wildlife Service and historical preservation agencies in remedial design to ensure compliance with these ARARs.

Federal and state standards for air[16] are action-specific ARARs at the OU. These standards are applicable to releases of lead and particulate matter during remediation. EPA anticipates that these ARARs can be met through the implementation of appropriate, standard operating procedures.

13.3 Cost Effectiveness

In EPA's judgment, the Selected Remedy is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness" [NCP § 300.430(f)(1)(ii)(D)]. This was accomplished by evaluating the overall effectiveness of the Selected Remedy and comparing that effectiveness to the overall costs. Overall effectiveness was evaluated by examining how the Selected Remedy meets three of the balancing criteria in combination – long-term effectiveness and permanence; reduction in toxicity, mobility, and volume; and short-term effectiveness. Overall effectiveness of the remedial alternatives was then compared to costs to determine cost-effectiveness. The relationship of the overall effectiveness of the alternatives was not necessarily proportional to costs.

It is important to note that more than one cleanup alternative may be cost-effective, and that Superfund does not mandate the selection of the most cost-effective cleanup alternative. In addition, the most cost-effective remedy is not necessarily the remedy that provides the best balance of tradeoffs with respect to the remedy selection criteria nor is it necessarily the least-costly alternative that is both protective of human health and the environment and ARAR-compliant.

Net present worth costs for each alternative were compared (see the evaluation of comprehensive alternatives in Table 10-1). The range of costs for each alternative represents the range and possible scope of actions to address mine waste and contaminated soil on the Butte Hill, storm water runoff, the treatment of collected groundwater, and different Metro Storm Drain waste material options. The cost of the Selected Remedy is expected to be $110 to $157 million (Table 12-10). EPA believes an appropriate balance between cost-effectiveness and adequate protectiveness is achieved in the Selected Remedy.

A significant amount of attention was focused on the remedy for the Metro Storm Drain area. Complete removal of the wastes in the Metro Storm Drain, as discussed in the analysis of alternatives, could cost $220 million, but would not effectively clean up

[16] Federal Clean Air Act(40 CFR 50.6) and Clean Air Act of MT (ARM 17.8.233)

the aquifer within a reasonable time frame to the point that groundwater standards are achieved or that long-term capture and treatment is not required. Analyses indicated that even by removing wastes, low aquifer permeability and wide distribution of residual contamination would prohibit the aquifer from meeting groundwater standards for hundreds of years. Regardless of the scale of the removal, groundwater would need to be treated for the foreseeable future. Additionally, extensive removals in the urban Metro Storm Drain corridor would cause significant disruption and pose short-term risks to the community. Managing the wastes in-place was determined by EPA to be both cost-effective and protective.

13.4 Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable

This determination looks at whether the Selected Remedy provides the best balance of trade-offs among the alternatives with respect to the balancing criteria set forth in NCP §300.430(f)(1)(i)(B), such that it represents the maximum extent to which permanence and treatment can be practicably utilized at this site. NCP §300.430(f)(1)(ii)(E) provides that the balancing shall emphasize the factors of "long-term effectiveness" and "reduction of toxicity, mobility, or volume through treatment," and shall consider the preference for treatment and bias against off-site disposal. The modifying criteria were also considered in making this determination.

EPA has determined that the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be used in a cost-effective manner at the BPSOU. Of those alternatives that are protective of human health and the environment and comply with ARARs or justify a waiver, EPA has determined that the Selected Remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element and bias against off-site treatment and disposal, and considering State and community acceptance.

Mine wastes and contaminated soils at the BPSOU are generally of large volume and low contaminant of concern concentration, which is difficult to treat effectively. In addition, technical difficulties prevent effective treatment of various metals present. Thus, active treatment was screened out as potential option for the solid media and long-term effectiveness is achieved through monitored engineering controls. Compared to the large-scale partial and total removal options, the Selected Remedy is expected to have greater short-term effectiveness with a lower level of risk to the community, cleanup workers, and the environment. The Selected Remedy was also among the more implementable of the remedial alternatives considered.

Treatment options were retained, however, for groundwater and surface water. Under the Selected Remedy, groundwater captured at LAO will be combined with contaminated groundwater from the West Camp bedrock system of the BMFOU and contaminated alluvial groundwater from Metro Storm Drain and routed to a lime treatment facility, where it will be treated to meet discharge standards and ARARs,

and subsequently discharged to Silver Bow Creek. Storm water discharge may also be similarly treated if BMPs are not effective in achieving surface water quality standards in Silver Bow Creek.

13.5 Preference for Treatment as a Principal Element

Treatment does not constitute a major component of the remedy for the BPSOU and the Selected Remedy does not satisfy the statutory preference for treatment as a principal element. However, EPA has determined that the source materials present in the BPSOU do not represent a principal threat, thus eliminating the expectation for treatment of these source materials. Although present in large volumes, source materials within the BPSOU are low in toxicity, can be reliably contained, and present only a relatively low risk in the event of exposure.

13.6 Five Year Reviews

Because the Selected Remedy results in contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted pursuant to CERCLA §121(c) and NCP §300.430(f)(5)(iii)(C). EPA shall conduct a review of remedial actions no less often than each five years after the initiation of such remedial action to assure that the remedy is, or will be, protective of human health and the environment.

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